

WHAT IS CLAIMED IS:

1. A process for forming on a substrate a transparent conductive film having crystallizability, the process comprising:

5 a first step of forming a film at a first film formation rate; and

a second step of forming a film at a second film formation rate;

10 the relationship between film formation rates in the respective steps satisfying:

2 ≤ (second film formation rate)/(first film formation rate) ≤ 100.

15 2. The transparent conductive film formation process according to claim 1, wherein, in the first step, nuclei are formed on the substrate, and, in the second step, a transparent conductive film is so formed as to cover the substrate surface and the surfaces of the nuclei over their whole area.

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3. The transparent conductive film formation process according to claim 1, wherein, in the first step, the film is formed in a thickness of from 1 nm to 100 nm.

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4. The transparent conductive film formation process according to claim 1, wherein, in the second

step, the film is formed in a thickness of 5 µm or less.

5       5. The transparent conductive film formation process according to claim 1, wherein, in the second step, the film is formed in a thickness of 1 µm or less.

10      6. The transparent conductive film formation process according to claim 1, wherein, in the first step, the first step is carried out such that the average distance between the apexes of hills themselves of the transparent conductive film formed in the first step and the average distance between the apexes of 15     hills of the transparent conductive film formed in the first step and the substrate surface are in a ratio of from 1:3 to 4:1.

20      7. The transparent conductive film formation process according to claim 1, wherein the transparent conductive film is formed by a roll-to-roll method in which a continuous substrate is put across rollers and transported therebetween.

25      8. The transparent conductive film formation process according to claim 1, which further comprises, after the second step, a third step of forming a

transparent conductive film at a third film formation rate, and the relationship between film formation rates in the respective steps satisfies:

5        $2 < (\text{second film formation rate}) / (\text{first film formation rate}) \leq 100;$

$2 \leq (\text{third film formation rate}) / (\text{first film formation rate}) < 100;$  and

$(\text{second film formation rate}) > (\text{third film formation rate}).$

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9. The transparent conductive film formation process according to claim 8, wherein, in the third step, the film is formed in a thickness of 5  $\mu\text{m}$  or less;

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10. The transparent conductive film formation process according to claim 1, wherein the transparent conductive film is formed by sputtering.

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11. The transparent conductive film formation process according to claim 10, wherein, in the second step, a target having been subjected to pre-sputtering is used.

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12. A process for producing a photovoltaic device; the process comprising the steps of:  
forming a transparent conductive film by the

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process according to claim 1; and  
forming a semiconductor layer.

13. A transparent conductive film formed by the  
5 process according to claim 1.

14. A photovoltaic device comprising a  
transparent conductive film formed by the process  
according to claim 1.

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